

# RENE UMEH

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## EDUCATION

- 
- 03/2020 – Present**      **Hanyang University | Bachelor of Mechanical Engineering** (*Seoul, South Korea*)
- GPA: 3.98/4.5
  - Awards and Scholarships: Hanyang International Excellence Award (2020,2021,2022), Global Korean Scholarship (2020), Samsung Global Hope Scholarship (2021~2023).
  - Activities: Hanyang Debate Society, Hanyang RACE club (life size EV manufacturing club).
- 01/2022 – 05/2022**      **University of Texas at Austin | International Exchange Program** (*Texas, USA*)
- GPA: 4.0/4.0
- 01/2018 – 05/2020**      **Hanyang Institute of International Education | Korean Language Program** (*Seoul, South Korea*)
- Grades: Speaking – 96/100, Writing – 98/100, Reading – 97/100, Listening – 96/100.
  - Awards and Scholarships: Outstanding Performance Scholarship.
- 09/2015 – 09/2018**      **St. Gregory's College | High School Education** (*Lagos, Nigeria*)
- Awards and Scholarships: High School Valedictorian, Helmbridge National Science Competition – First Place.

## WORK EXPERIENCE

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- 09/2023 – Present**      **Hanyang University with SPACEMAP | Research Assistant** (*Seoul, South Korea*)
- Key Responsibilities*
- Optimized 3D Voronoi diagram tessellation algorithms to detect collisions of RSOs in space.
  - Designed and deployed a chatbot and custom GPT using company API, accounting for 20% of API calls.
  - Managed front-end development of the company's website. Increased content impressions on LinkedIn by 2000%.
- 06/2023 – 08/2023**      **Korean Institute of Science and Technology (KIST) | Intern** (*Seoul, South Korea*)
- Key Responsibilities*
- Created a database of 200 3D modelled characters for training a 3D reconstruction model based on PiFU.
  - Tested performance and updates on image to 3D reconstruction task.
- 06/2022 – 08/2022**      **Rice University with Lavner Education | IT Intern** (*Houston, USA*)
- Key Responsibilities*
- Maintaining database for students, fee payments, and registrations. Processing paperwork and responding to user requests.
  - Taught and designed separate lesson plans for middle to high school student on various courses weekly. Adapted classes according to age and skill level to teach IT concepts like programming languages (Java, C++), git control, 3D printing, graphic design, CAD.
- 12/2020 – 02/2021**      **OHP Finishings Ltd. | AI Intern** (*Lagos, Nigeria*)
- Key Responsibilities*
- Designed and finetuned a segmentation model to demo wallpaper designs on walls in pictures.
  - Managed correspondence between the firm and Korean trading partners which involved translating between English and Korean.


## EXTRACURRICULAR & VOLUNTEERING ACTIVITIES


- 
- 09/2022 – Present**      **Samsung Foundation Scholars' Union | President** (*Seoul, South Korea*)
- Organized student outreach and networking programs and planned funding for the union's yearly budget; prepared financial reports.
- 11/2020 – Present**      **Hanyang RACE club | Mechanical Part Design Team** (*Seoul, South Korea*)
- Designed, developed, and tested parts for formula racing car projects. Optimized chassis, truss and suspension systems using Catia.

## SKILLS & PERSONAL DEVELOPMENT


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- Programming Languages and Frameworks: Python, C++, JavaScript, Git, MATLAB, HTML.
  - Engineering CADs: SOLIDWORKS, AutoCAD, Catia, Ansys.
  - Spoken Languages: English (Native Speaker), Korean (Fluent).

# RENE UMEH

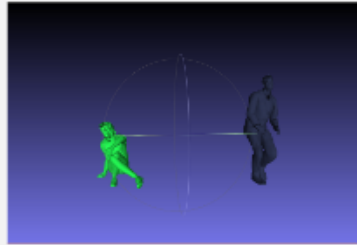
 Hanyang University

 : 010-2532-9420

 : [dubemrene@gmail.com](mailto:dubemrene@gmail.com)

 : [reneumeh.github.io](https://github.com/reneumeh)

## CONFIDENTIAL – Korean Institute of Science & Technology



3d obj



Semantic Segmentation



RGB render



Normal render

### Goal

- Create and train a model capable of generating 3d representations of 2d instances, based on PiFu infrastructure.

### Process

- Created a synthetic 3D dataset using **NVIDIA Omniverse** for training model including RGB, normal, and depth renders, and joint information of human characters, with specific focus on break dancing scenes and scenes containing furniture.

### Result

- Created a dataset of 200 unique scenes containing characters and furniture and trained 3D prediction model.

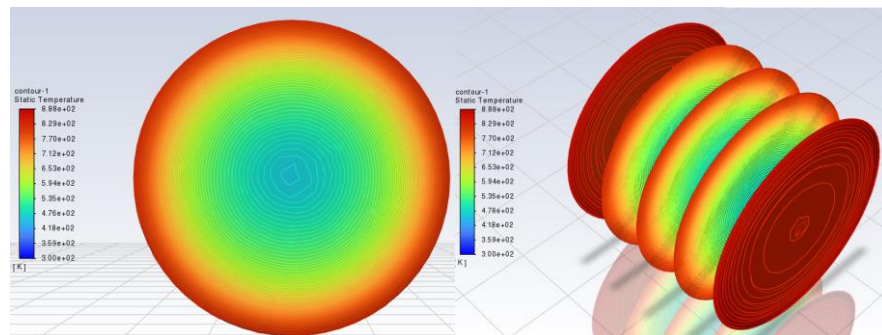
## Bachelor's Degree Graduation Thesis – Hanyang University

Numerical analysis of venturi effect on temperature in LPCVD batch-type furnace

Kim Doyeon  
Lee Seonghun  
Umeh Rene

Department of Mechanical Engineering  
Hanyang University  
Seoul, Korea

May, 2023



### Goal

- Numerical Analysis of the Venturi Effect on the temperature in a LPCVD (Low Pressure Chemical Vapor Deposition) batch-type furnace. [Increase the uniformity of silicon wafers]

### Process

- Performed calculations to determine the estimated effect of changing the geometry of the reactor. Performed simulations using **ANSYS Fluent** to corroborate calculation results. Calculated the effect of temperature change on deposition uniformity using **MATLAB**.

### Result

- Determined the effect of the temperature distribution on the thickness of the oxide layer on the wafers were performed. Obtained the optimum radius for this geometry of the reactor.

## Company Chatbot & OpenAI Integration – SPACEMAP Inc

```

} else if(status === 'requires_action'){

  const required_action = run_data.required_action
  const required_tools = required_action.submit_tool_outputs.tool_calls

  let tool_output_items = []

  for(let rtool of required_tools){

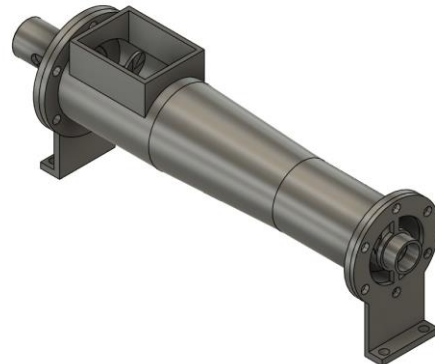
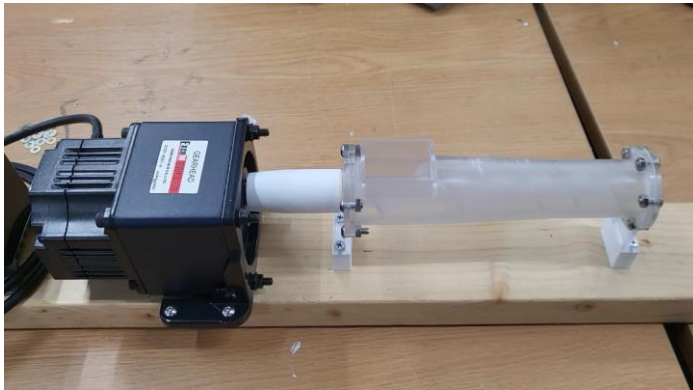
    const function_name = rtool.function.name
    const tool_args = JSON.parse(rtool.function.arguments)

    let tool_output = await callMockAPI(function_name, tool_args)

```

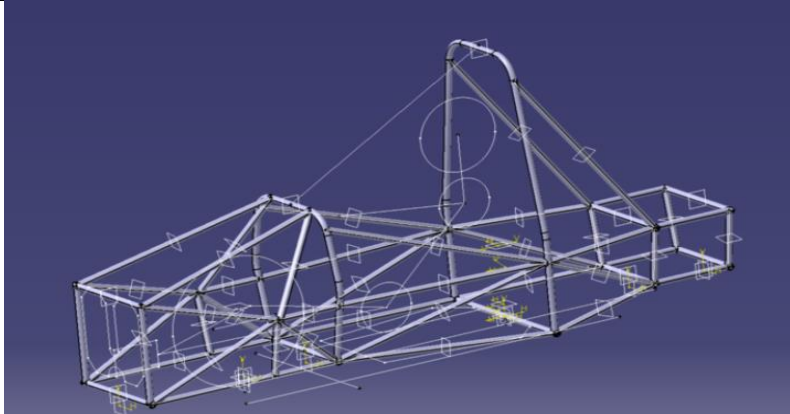
Goal	Process	Result
<ul style="list-style-type: none"> <li>Create a chatbot interface and a custom GPT using OpenAI's services and the company's APIs</li> </ul>	<ul style="list-style-type: none"> <li>Created a backend endpoint to handle message input, OpenAI API calls, Company API calls and output using <b>Next js</b>.</li> <li>Designed and created frontend UI/UX for chatbot using <b>React</b></li> <li>Created custom GPT using company APIs</li> </ul>	<ul style="list-style-type: none"> <li>Successfully created and deployed chatbot and custom GPT, accounting for 20% of all API calls.</li> </ul>

## Dumpling Screw Redesigning Challenge – CJ Foods



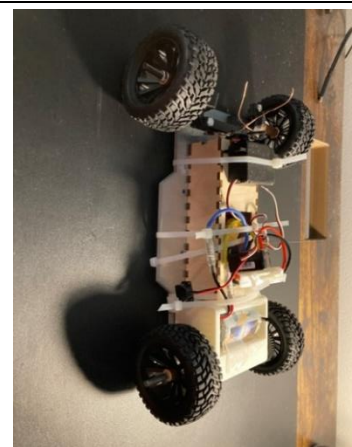
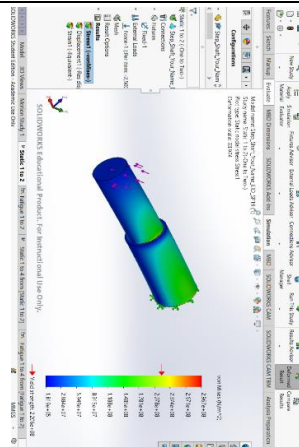
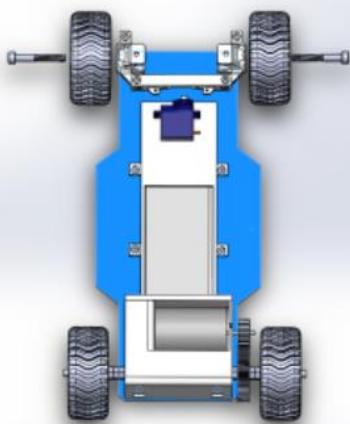
Goal	Process	Result
<ul style="list-style-type: none"> <li>Redesign the screw used for kneading and conveying dumpling dough.</li> </ul>	<ul style="list-style-type: none"> <li>Created design considerations for screw (modularity, speed, retention of food particles, high shear rate zones)</li> <li>Made design adjustments and calculated the estimated effect of design adjustments.</li> <li>Performed simulations on <b>ANSYS Fluent</b> and miniature model to corroborate calculation results</li> </ul>	<ul style="list-style-type: none"> <li>Adjusted flight angle, clearance &amp; screw pitch to reduce retentions of food particles and increase regions of high shear rate.</li> <li>Created a more modular and easier to maintain design for the screw</li> </ul>

## Race car Truss Structure Project – Race Club



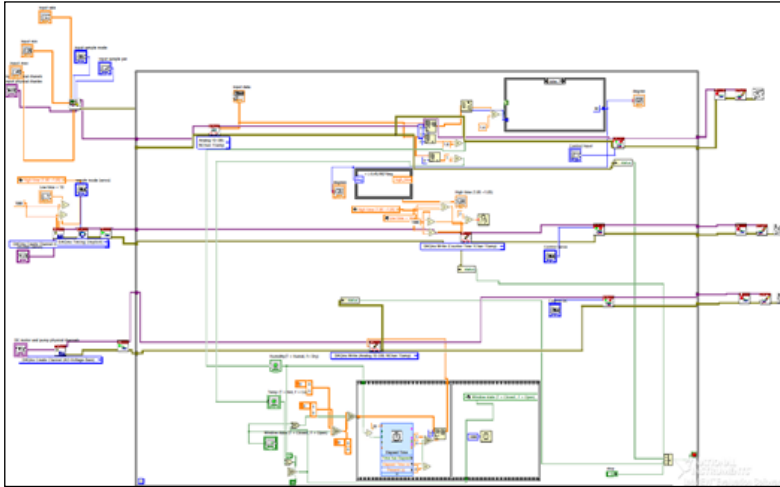
Goal	Process	Result
<ul style="list-style-type: none"> <li>Analyze the previous truss structure of the car and propose a better truss structure to increase structural rigidity.</li> </ul>	<ul style="list-style-type: none"> <li>Used <b>Catia</b> to analyze the structural stiffness of truss structure and load.</li> <li>Cut and welded pipes in the workshop.</li> </ul>	<ul style="list-style-type: none"> <li>Increased structural rigidity by 9%.</li> </ul>

## RC Car Project – Machine Elements Course



Goal	Process	Result
<ul style="list-style-type: none"> <li>Build an RC car with \$50 budget.</li> <li>Design the RC car to be dynamically safe while optimizing speed.</li> </ul>	<ul style="list-style-type: none"> <li>Designed and analyzed chassis and axle, steering, drivetrain, and joints using <b>SOLIDWORKS</b>.</li> <li>3D printed or ordered parts from suppliers.</li> </ul>	<ul style="list-style-type: none"> <li>Designed the car to withstand collisions at a maximum speed of 10 m/s.</li> <li>Placed third place in the driving competition.</li> </ul>

## Automatic Greenhouse Project – Mechanical Design & Experiments Course



Goal	Process	Result
<ul style="list-style-type: none"> <li>Create a model for an automated greenhouse with a budget of 100,000 won.</li> </ul>	<ul style="list-style-type: none"> <li>Used <b>LABVIEW</b> to create a program that processes light, humidity, and temperature signals from sensors.</li> <li>Purchased motors, breadboards, sensors, and acrylics from suppliers.</li> </ul>	<ul style="list-style-type: none"> <li>Completed the working model within the allotted time and budget.</li> </ul>

## Vibrating Disk Analysis Experiment – Machinal Vibrations Course

